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Comparisons of Blood Pressure between Asian-American Children and Children from Other Racial Groups in Chicago

SYNOPSIS

RESEARCHERS COMPARED AVERAGE BLOOD PRESSURE, prevalence of elevated blood pressure, and average anthropometric measurements of Asian children with those same measures in children from other racial and ethnic groups, including blacks, whites, and Hispanics. The sample consisted of 1318 boys and 1548 girls ages 6 to 9 who had complete blood pressure and anthropometric data, which were derived from a health screening program in nonpublic schools conducted by the Chicago Department of Health from 1975 to 1978.

The systolic pressure, adjusted for age, weight, and height, for Asian, black, Hispanic, and white boys was 108.1, 105.8, 104.7, and 105.6 mmHg, and for diastolic pressure, the adjusted values were 59.6, 58.9, 56.3, and 57.4 mmHg. For both systolic and diastolic, the differences between Asian boys and white boys and between Asian boys and Hispanic boys were statistically significant. For girls, the results were similar. In addition, for boys, the prevalence rates of elevated blood pressure (systolic greater than or equal to 122 mmHg or diastolic greater than or equal to 78 mmHg) were similar among the four groups. For girls, the prevalence rate for Asians was higher than those in the other groups; however, the differences were not statistically significant. Since hypertension is a major health problem in Asians, it is important to confirm these findings and to understand why mean blood pressure adjusted for age and body size is higher in Asian children than in other racial groups.

Comparisons of blood pressure between black and white American children have been examined extensively (1-5). Few data are available, however, on blood pressure levels and other risk factors for Asian-American children. From 1975 to 1978, the Chicago Department of Health conducted a screening program, including blood pressure and various anthropometric measurements, for children in nonpublic schools. The sample included white, black, Asian, and Hispanic children and provided an opportunity to examine possible racial differences in blood pressure and anthropometric measurements.

Table 1. Baseline characteristics by racial groups in children ages 6 to 9 in 1975 to 1978

The Chicago Children's Study

Sex	Variables	Asian (n Boys = 119) (n Girls = 124)		Black (n Boys = 178) (n Girls = 309)		Hispanic (n Boys = 106) (n Girls = 134)		White (n Boys = 915) (n Girls = 981)	
		Mean	s	Mean	s	Mean	s	Mean	s
Boys	SBP (mmHg)	106.9	10.0	107.2	10.0	105.0	8.9	105.4	9.0
	DBP (mmHg)	58.9	10.5	59.4	8.3	56.1	8.2	57.4	8.6
	Weight (kg)	25.6	6.0	29.7	9.1	27.8	7.3	27.0	6.4
	Height (cm)	125.8	7.6	131.7	9.4	127.2	8.6	129.8	9.2
	Triceps Skinfold Thickness (mm)	10.1	4.5	9.8	5.2	11.4	4.7	9.9	4.2
	BMI (kg/m ²)	16.0	2.6	16.8	3.3	17.0	3.1	15.9	2.4
	Age (yrs)	7.4	1.0	7.4	1.1	7.5	1.1	7.5	1.1
Girls	SBP (mmHg)	106.6	10.9	107.2	9.1	104.8	9.5	106.0	9.4
	DBP (mmHg)	60.7	9.1	58.5	8.9	56.9	9.3	58.3	8.6
	Weight (kg)	23.7	5.2	29.0	8.5	26.6	7.6	26.5	6.6
	Height (cm)	123.9	7.9	131.6	9.3	125.4	9.5	128.7	8.7
	Triceps Skinfold Thickness (mm)	10.8	3.8	11.5	5.4	12.4	4.4	11.7	4.4
	BMI (kg/m ²)	15.3	2.1	16.5	3.3	16.6	3.3	15.8	2.6
	Age (yrs)	7.3	1.0	7.4	1.1	7.2	1.0	7.5	1.1

Methods

Building on an ongoing screening program operating in Chicago schools, the Chicago Department of Health expanded its health components to include hearing and vision screening, along with self-reported data on birth date and race and measurements of blood pressure, heart rate, height, weight, and triceps skinfold thickness. Blood pressure measurements were made by four technicians who were trained according to the American Heart Association method (6). The survey began in the fall of 1975, and lasted for 14 nonconsecutive months until the fall of 1978. Twenty-seven schools participated.

We asked the children to remove their shoes and upper garments, and recorded height in inches and weight in pounds. We then converted the values to centimeters and kilograms. We measured triceps skinfold at the midpoint between the acromial and olecranon processes and recorded in millimeters using a Lange caliper according to the techniques described by Selzer and Mayer (7). We then asked the children to void if necessary and then walk to a quiet corner, concealed from view, where cots were located. After the children had lain supine for 4 minutes, we took their blood pressure twice for the first and fifth Korotkoff phases. We also recorded heart rate for 15 seconds along with two more blood pressure measurements.

We based analyses on data from a sample of 1318 boys and 1548 girls ages six to nine with complete blood pressure and anthropometric data. The children classified themselves as white, black, Asian, or Hispanic (Mexican, Puerto Rican, and other Hispanics); others were excluded. We used each child's average second and third blood pressure measurements in the analyses, and we defined elevated blood pressure as systolic ≥ 122 mmHg

or diastolic ≥ 78 mmHg, as suggested in *Report of the Second Task Force on Blood Pressure Control in Children* (8).

We performed statistical analyses for comparing the mean blood pressure and anthropometric measurements between groups using Scheffe's test with overall level of significance set at 0.05. Analysis of covariance compared the mean levels between racial groups with adjustment for covariates. The individual significance level of comparison of racial groups was set at 0.017 so that the overall level of significance was 0.10 or less.

Results

Table 1 presents the characteristics of the boys and girls studied. For both boys and girls, Asian children tended to be shorter and weighed less than children in other racial groups, while black children were taller and

Table 2. Prevalence (%) of elevated blood pressure in children ages 6 to 9 in 1975 to 1978

	Asian (n Boys = 119) (n Girls = 124)	Black (n Boys = 178) (n Girls = 309)	Hispanic (n Boys = 106) (n Girls = 134)	White (n Boys = 915) (n Girls = 981)
Boys				
SBP ≥ 122 mmHg	3.4	8.4 ^a	3.8	3.9 ^a
DBP ≥ 78 mmHg	5.0 ^b	2.8	0.9	1.3 ^b
SBP ≥ 122 mmHg or DBP ≥ 78 mmHg	6.7	9.0	4.7	5.1
Girls				
SBP ≥ 122 mmHg	9.7	5.5	6.0	5.7
DBP ≥ 78 mmHg	3.2	1.3	0.0	1.5
SBP ≥ 122 mmHg or DBP ≥ 78 mmHg	11.3	6.5	6.0	6.6

^a The rates (black versus white) are significantly different at $\alpha = 0.017$.
^b The rates (Asian versus white) are significantly different at $\alpha = 0.017$.

weighed more than the other children. For boys, the average triceps skinfold thickness was higher in Hispanics than in Asians, blacks, and whites; the values were similar among the latter groups. For girls, the average values for skinfold thickness was the lowest in Asians and highest in Hispanics. Average blood pressure was higher in Asian and black boys than in white and Hispanic boys, although the differences were not statistically significant. Similar findings were also obtained for systolic pressure in girls. Asian girls had the highest diastolic pressure. Again, none of the differences was significant.

When we controlled for age, weight, and height, Asian boys had the highest blood pressure. For systolic pressure, the adjusted values for Asian, black, Hispanic, and white boys were 108.1, 105.8, 104.7, and 105.6 mmHg, and for diastolic pressure, the adjusted values were 59.6, 58.9, 56.3, and 57.4 mmHg. The differences in systolic and diastolic pressure between Asian and white boys and between Asian and Hispanic boys were statistically significant. For both systolic and diastolic, the adjusted level was significantly higher in Asian girls than in any of the other racial groups.

Table 2 presents the prevalence rates of elevated blood pressure. For boys, the prevalence rate in Asians was not different from those in other racial groups. For girls, the prevalence rate for Asians was higher. However, the differences were not statistically significant.

Conclusion

We examined the differences in mean blood pressure between Asian children and children from other racial groups. The results suggest that Asian children have higher average blood pressure than Hispanic and white children, and that these differences are independent of age, weight, and height. The blood pressure levels were similar between Asian and black children, but the age-, weight-, and height-adjusted blood pressure was also higher in Asian children than in black children. Since hypertension is a major problem among Asians, it is important to confirm these findings and to understand why mean blood pressure, adjusted for age and body size, in Asian children is higher than in the other groups studied.

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